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Political Strikes and its Impact on Trade: Evidence from Bangladeshi Transaction-Level Export Data*

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Abstract

In this paper we estimate the impact of violent political strikes on firm exports using daily, firm-level exports data from Bangladesh. These strikes, locally known as *hartals*, are organized by opposition political parties and interest groups in Bangladesh as a form of protest against the government. These strikes are especially costly because they are used to coercively shut down factories, roads, ports, as well as all private and public institutions. Our results suggest that *hartals* have an adverse effect on firm exports that is both statistically and economically significant. In particular, we find that the cumulative effect of a *hartal* over a seven-day period results in a reduction in firm exports of 4.5 percent. Our results also indicate that *hartals* have stronger effects on smaller exporters as well as exporters producing lower-priced, generic products. Finally, we find that the cumulative effect of a *hartal* over a seven-day period results in an increase in a firm's use of air shipment by 2.1 percentage points.

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1. Introduction

Delays are an important barrier to international trade. Djankov, Freund, and Pham (2010) estimate that an additional day spent prior to shipment reduces trade by more than 1 percent.[4] Similarly, Hummels and Schaur (2012) estimate that each day spent in transit costs a firm 0.6–2.1 percent of its shipment's value. Such delays are extremely costly for several reasons. First, delays impose significant inventory-holding costs. Second, delays are costly for firms that export or import perishable goods as well as goods that have seasonal demand. The existing literature has focused on two key sources of these delays: (a) weak domestic infrastructure and procedural barriers at ports (Djankov et al. 2010) and (b) the mode of transport used (Hummels 2007; Hummels and Schaur 2010, 2013). In this paper we examine a third source of delays for exporting firms: political violence. In particular, we examine how violence due to political strikes impact exports in Bangladesh during the period 2005−2013.

These strikes, locally known as *hartals*, are organized by opposition political parties and interest groups in Bangladesh as a form of protest against the government. These strikes typically last an entire working day although the duration could either be shorter or longer. While *hartals* trace their roots to earlier episodes of civil disobedience against colonialism in South Asia, their prevalence in Bangladesh has increased dramatically in recent years.[5] *Hartals* are especially costly because they are used to coercively shut down factories, roads, ports, as well as all private and public institutions. The requirement that such activities/institutions be halted is enforced by the threat of violence. For example, during a recent *hartal* on December 11, 2012, pro-*hartal* 'activists' set several vehicles on fire in the capital Dhaka. Such acts of violence

[4] This includes the time spent transporting a product from the factory to the port along with the time required to complete the procedures needed to export.

[5] UNDP (2005) reports that there were a total of 1,072 *hartals* in Bangladesh between 1987 and 2002. In other words, on average, there was a hartal every 5.4 days in Bangladesh over this period. This report also estimates that the cost of *hartals* during the 1990s was 3–4 percent of Bangladesh's GDP.

provide a strong incentive for local businesses to keep factories closed and to not use the roads to transport products.

In this paper we estimate the impact of these *hartals* on firm exports using daily, firm-level exports data from Bangladesh. In addition to quantifying the magnitude of this effect, we exploit the richness of our data to examine how firms cope with the disruption caused by *hartals*. That is, we examine how firms attenuate the adverse effect of *hartals*. In particular, we focus on two coping strategies: (a) the shifting of export shipments to several days following a *hartal* and (b) switching to the far costlier air shipment to meet shipment deadlines.

We examine these issues using two sets of data: (a) data on *hartals* and (b) daily, firm-level data on exports. The data on *hartals* were collected from two daily newspapers in Bangladesh for the period 2005−2013. We collected information on the date and duration (half day, full day, etc.) of each *hartal*. We also collected information on when a *hartal* was announced to capture the amount of time that firms had to adjust their shipment plans. In addition, we also collected information on the following characteristics of *hartals*: (i) the extent of violence during a *hartal*, (ii) the stated reason for calling a *hartal*, and (iii) the party or organization that called the *hartal* (e.g. the main opposition party, bus-truck owners' association, etc.). To our knowledge, such comprehensive data on *hartals* in Bangladesh during this time period are not available elsewhere.

We then combine our *hartal* data with firm-level, administrative trade data for Bangladesh. These data, which are collected by the National Bureau of Revenue (NBR), include the universe of export transactions for Bangladesh and also cover the period 2004 – 2013. We use these data to construct a firm and day panel. This is important as it allows us to include firm and various time fixed effects to control for confounding factors. The NBR also collects information on the port of export for each transaction. This allows us to distinguish between shipments made by sea and by air for all exports. As mentioned before, *hartals* may force exporters to

transport their products by costlier means (e.g. by air) to meet their deadlines. We can use our data to examine the extent to which this occurs.

Our results suggest that *hartals* have an adverse effect on firm exports that is both statistically and economically significant. In particular, we find that on the day of a *hartal*, firm exports decline by 6.6%. However, we also find that firms cope with the disruption caused by *hartals* by delaying their exports by several days. As a result of this coping strategy, the contemporaneous effect mentioned above represents the upper bound (in terms of magnitude) of the effect of *hartals* on firm exports. When we consider firm exports over a seven-day period that starts with the day before a *hartal* and extends to five days after a *hartal*, we find that the cumulative effect of a *hartal* is a reduction in firm exports of 4.5%. We interpret this as evidence that firms attenuate the effect of a *hartal* by increasing their shipments several days after the *hartal* itself. Our results also suggest that *hartals* have stronger effects on smaller exporters as well as exporters producing lower-priced, generic products.

Another coping strategy that we identify in the data is the increased use of air shipment in response to a *hartal*. In particular, we find that on the day of a *hartal*, firm exports by air increase by 3 percentage points. In our data, 19.8% of shipments are made by air. Thus, this estimated impact represents a significant increase in the likelihood of air shipment. Once again, we find that firms attenuate the adverse effects of a *hartal* by lowering air shipments several days after a *hartal* itself. When we consider the use of air shipment over a seven-day period that starts with the day before a *hartal* and extends to five days after a *hartal*, we find that the cumulative effect of a *hartal* is an increase in the likelihood of air shipment of 2.1 percentage points. In other words, in response to a *hartal*, firms increase the use of air shipment on the day of the *hartal* itself but reduce it several days after the *hartal*.

This paper is related to a literature that uses the gravity model to examine the impact of conflict on trade. For instance, Blomberg and Hess (2006) examine how various types of conflict affect bilateral trade between countries. Their estimates suggest that violent conflict is a greater barrier to trade than traditional tariff barriers. This result is supported by Glick and Taylor (2010), who use historical data spanning the period 1870−1997 to estimate the effect of conflict on bilateral trade. Their results suggest that conflict has large and persistent adverse effects on trade. Lastly, Martin, Thoenig and Mayer (2008) also use a gravity equation to examine the impact of civil conflict on bilateral trade between countries. Their findings suggest that, a year after a conflict, a country's trade is reduced by 25 percent relative to its trade in the absence of a conflict.

This paper is also related to a nascent literature examining the impact of natural disasters on trade. A recent contribution to this literature is Besedes and Murshid (2014). They examine how the eruption of the Icelandic volcano, Eyjafjallajökull, impacted exports from the affected countries to the U.S. and Japan. Similarly, Volpe Martincus, and Blyde (2013) study the effect of a Chilean earthquake in 2010 on export volumes. Lastly, this paper is related to an extensive literature on the impact of conflict on firm performance.[6]In particular, our paper is most closely related to Ksoll, Macchiavello, and Morjaria (2010), who examine the impact of the 2007 post-election violence in Kenya on the export of flower producers there. Because flowers are highly perishable, any delays due to conflict are expected to have a strong adverse effects on flower exports. Ksoll et al. (2010) confirm that this is the case. They find that the post-election violence increased worker absenteeism by 50 percent and reduced flower exports by 38 percent. The sudden and unanticipated nature of the violence allows the authors to identify the causal effects of the violence on exports. However, given the unique nature of the floriculture industry, it is

[6] See Blattman and Miguel (2010) for a comprehensive review of the literature on the economic impacts of conflict.

unclear whether their results speak to the general impact of conflict on firm exports. Further, given that the post-election violence was short lived and unexpected, it cannot be used to examine if and how firms cope with the adverse impact of the violence. On the other hand, our setting does allow us to examine such coping behavior.

The rest of the paper is structured as follows. In section 2 we discuss the method we followed to construct our *hartal* database. In this section we also describe our firm-level export data. In section 3 we discuss the econometric method we use to identify the effect of *hartals* on firm-level exports. In section 4 we discuss our results.

2. Data

As mentioned above, the data on *hartals* are not readily available. Hence, we collected and compiled information on *hartals* from the two most popular Bengali and English language daily newspapers in Bangladesh–. These are The Daily Ittefaq and The Daily Star respectively. Our research assistants went through the archives of these newspapers for each day of our sample period to collect the information on *hartal*. In order to avoid data collection errors, we had two research assistants independently collect this information. We then compared the entries and corrected any discrepancies.

Apart from collecting the date when the *hartal* occurred, we also collected the announcement date. Other information about *hartal* that we collected include the length of a *hartal*, extent of violence, the political party(s) calling the *hartal* and reasons for calling the *hartal*. The extent of violence is captured by the number of people injured and killed. We take simple arithmetic mean of the reported numbers of the two newspapers. That is why the average number of people killed and injured may be reported as a fraction (Table 1). In general, demonstrations and other political activities also take place one day before the *hartal* in support

for the *hartal* of the following day(s). These activities also involve violence. We categorize such violence as being related to a *hartal*.

The most difficult part of compiling the data was to collect the data on the number of persons injured and killed. In some cases, the exact number is not reported. For instance, the newspaper may state that "dozens of people were injured" or "more than a hundred people were injured". In such cases, if one newspaper reports the number, we use that one only. If both the newspapers are vague about the number, we used a third newspaper, The Prothom Alo, which is another popular Bangla daily newspaper.

Figure 1 illustrates the annual trend in *hartals* during the period 2005−2013. In the first half of this time period, the prevalence of *hartals* was increasing immediately before the general elections that were scheduled for 22nd January, 2007. These *hartals* in the 2005−2006 period were mainly called by the then opposition party, the Awami League, and its coalition partners to protest the legitimacy of the elections to be held in early 2007. In the face of increasingly violent unrest, the Bangladeshi military intervened on 11th January, 2007 and installed a military-backed caretaker government. This government remained in power until the general elections held on 29th December, 2008. As Figure 1 illustrates, this period of military-backed rule was relatively free from *hartals*. However, the prevalence of *hartals* again increased during the year preceding the general elections that were held on 5th January, 2014. These *hartals* were called by the Bangladesh Nationalist Party and its coalition partners, which were in the opposition at the time to protest the 2014 elections that were to be held under a partisan government for the first time since the restoration of democracy in 1991.

Next, as Table 1 demonstrates, not only did *hartals* become more frequent during the second half of our sample period, the *hartals* themselves become more intense. The first row confirms the trend depicted in Figure 1. It shows that, of the 152 *hartals* called during our sample

period, 99 were called during the second half of our sample period (2010−2013). Further, the *hartals* during this second half were much more likely to be strikes rather than blockades. The former is a nationwide, forced shutdown of factories, roads, and other methods of transportation while the latter is a blockade of all roads and railways into and out of major cities, primarily the capital Dhaka.

Further, the *hartals* in the second half of our sample period were also called with less notice provided to firms. For instance, during the period 2005−2009, *hartals* were announced about 7 days before the *hartal* itself. However, during the period 2010−2013, *hartals* were announced about 4.5 days before the *hartal* itself. Lastly, during first half of our sample period, there were about 0.5 deaths per *hartal* whereas in the second half, there were about 2 deaths per *hartal*. However, the number of injuries did decrease from about 133 per *hartal* in the first half to 102 per *hartal* in second half. Thus, Figure 1 and Table 1 indicate that not only have *hartals* become more prevalent in Bangladesh in recent years, they have also become more violent and intense.

The data on daily exports are from the National Board of Revenue (NBR), which administers daily custom information using ASYCUDA++. This Automated System for Customs Data is a computerized system designed by the United Nations Conference on Trade and Development (UNCTAD). Our transaction level data on export comes from this ASYCUDA system. While this system compiles a wide range of information regarding a particular transaction, we use only a few of them which have direct bearing on our study. This includes date of export, exporters' unique identification number, total volume of export, HS codes of the product and ports of export. Table 2 provides descriptive statistics of these trade data. All monetary values reported in the paper are in constant 2010 Bangladesh Taka. This table

indicates that the average firm in our data exports 2.4 million Taka worth of goods each day. Of these shipments 20.4 percent are through air transport.

3. Econometric Method

To examine the relationship between *hartals* and exports, we follow the approach used by earlier papers that examine the effect of a transportation shock on export volume. For example, Besedes and Murshid (2014) use monthly import data to examine the effect of the eruption of Iceland's Eyjafjallajökull volcano in 2010 on exports of affected countries to the U.S. and Japan. Similarly, Volpe Martincus and Blyde (2013) study the effect of a Chilean earthquake in 2010 on export volumes. Finally, Ksoll et al. (2010) examine the effect of election-related violence on flower exporters in Kenya.[7] Implementing such an approach involves estimating the following econometric specification:

$$\ln(X_{it}) = \alpha_1 + \beta H_t + \gamma \varphi_d^y + \theta_i + \theta_d^w + \theta_m + \theta_y + \epsilon_{it} \quad (1)$$

where X_{it} is the value of firm i's total exports on day t.[8] We also use as a dependent variable an indicator for whether a firm uses air shipment to export their goods. Here our aim is to capture whether a firm switches to the far costlier air shipment to ensure that their goods reach their buyers on time.

$H_t$is an indicator variable that is one if there was a *hartal* on day t and zero otherwise. Thus, β captures the contemporaneous effect of a *hartal* on firm exports. $\theta_i$are firm fixed-effects that control for unobserved, time-invariant firm characteristics that are correlated with both exports and *hartals*. We also include a day-of-year trend (φ_d^y) in our econometric specification.

[7] While they do not examine the effect of a transportation shock, Chor and Manova (2013) use a similar approach to estimate the effect of the Global Financial Crisis on international trade flows.

[8] Some firms in our sample make multiple export shipments during a particular day. In such cases, we add together all shipments for such firms during that day. In other words, we have one observation per firm during its export days.

This controls for any seasonal factors that might be correlated with exports. For instance, exports for particular products might exhibit strong seasonal patterns (e.g. summer or winter clothing). Thus, by not including a day-of-year trend, our regression estimates might be picking up spurious changes in the data. We also include day-of-week fixed effects (θ_d^w), which will capture any secular variation in exports during the week. Further, we include month fixed effects (θ_m) to further control for seasonal patterns in exports and year fixed effects (θ_y) to capture macro-level factors that are correlated with *hartals* as well as a firm's export decision. Lastly, ϵ_{it} is a classical error term.

A limitation of the above approach is the implicit restriction that *hartals* only affect exports on the day on which it is organized. While this is perhaps appropriate for a sudden, one-time shock such as a volcanic eruption or an earthquake or for a perishable product such as flowers, it is an important shortcoming in our context for the following reason. Unlike a natural disaster or sudden outbreak of post-election violence, *hartals* are not completely unexpected. While some *hartals* are announced with less than twenty-four hours' notice, most are announced a few days before the *hartal* itself.[9] This means that firms have the opportunity to change their shipment dates to ensure that all of its intended export goods are shipped to the buyer. The econometric specification in equation (1) will not be able to capture this coping strategy. To examine whether there is evidence of such shipment reallocations, we estimate the following econometric specification:

$$\ln(X_{it}) = \alpha_2 + \sum_{s=-1}^{5} \beta_s H_{t-s} + \gamma \varphi_d^y + \theta_i + \theta_d^w + \theta_m + \theta_y + \varepsilon_{it} \quad (2)$$

Here H_{t-s} is an indicator variable for whether there was a *hartal* on day $t-s$. Thus, each coefficient β_s captures the impact of a *hartal* that occurred s days ago on today's exports. The use

[9] As Figure A1 illustrates, 16.5% of *hartals* are announced the day before the *hartal* and 56.6% of *hartals* are announced with three or fewer days' notice.

of lagged *hartal* indicators allows us to capture the extent to which firm's reallocate their shipment away from *hartal* days and towards days immediately following a *hartal*. Thus, if such reallocation is not prevalent then we would expect β_s to equal zero for all $s \neq 0$. The remaining control variables in equation (2) are as defined before while ε_{it} is a classical error term. To ensure that our inference is correct, we report heteroskedasticity robust standard errors that are clustered at the exporter level.

An important feature of our econometric strategy is that we are capturing short-run effects of *hartals*. This raises the question of whether we should expect *hartals* to have such immediate effects. To examine this issue further, we first calculate the number of days each year that firms in our sample make export shipments. The results of this calculation are illustrated in Figure 2. Our data suggest that the median number of days exported per firm per year in our sample is 54. Further, we also find that the median gap between shipments for the firms in our sample is 3 days. These numbers suggest that the firms in our data are high-frequency exporters and that we should expect a *hartal* on any given day to have an immediate effect on exports. This motivates us to use only five lags of *hartals* in our econometric model.

In addition to this default measure of *hartals*, we exploit our rich data and use alternate measures that capture the heterogeneous nature of *hartals*. For instance, some *hartals* are announced without much notice, others involve the death of political activists, while some only involve a blockade of the capital city. We examine whether the impact of *hartals* varies according to these characteristics.

4. Results

4.1 *Hartals* and Export Value

Table 3 reports the results from estimation equations (1) and (2). In column (1) we estimate the contemporaneous effect of a *hartal* (equation (1)), i.e. the effect of a *hartal* on firm exports on that day. The coefficient of the *hartal* indicator confirms that *hartals* have a statistically significant, negative effect on firm exports. This effect is also economically significant. The coefficient of the *hartal* indicator indicates that a hartal lowers the exports of the average firm in the sample by 6.6% on that day.

As discussed above, estimating only this contemporaneous effect ignores the possibility that firms can reallocate their export shipments away from the day of the *hartal* and towards other days. To the extent that such reallocation is prevalent, it will attenuate the effect of *hartals* on firm exports. The extent of reallocation is highlighted by Figure 3, where we plot daily exports by month along with indicators for *hartal* days during 2013. This figure illustrates the tremendous volatility in exports immediately preceding and following the day of a *hartal*. In fact, in many cases, the increase in exports immediately after a *hartal* is evident in the raw data.

We examine this adjustment behavior further by estimating equation (2). In column (2) of Table 3 we include two additional *hartal* indicators. The first is an indicator that is one if there will be a *hartal* tomorrow and is zero otherwise (H_{t+1}). This indicator measures whether firms change their shipments the day before a *hartal* takes place. The second *hartal* indicator is one if there was a *hartal* yesterday and zero otherwise (H_{t-1}). This indicator measures whether firms change their shipments the day after a *hartal* takes place.

The coefficient estimate for H_{t+1} is positive, which suggests that firms, on average, increase their shipments the day before a *hartal* takes place. However, this estimate is not statistically significant. On the other hand, the coefficient estimate for H_{t-1} is negative, which suggests that firms, on average, decrease their shipments the day after a *hartal* takes place. This is because there is often *hartal*-related violence and protests the day after a *hartal* itself. The magnitude of this estimate is also substantial. It suggests that a *hartal* lowers the exports of the average firm in the following day by 1.1%.

We can use our estimates to calculate the cumulative effect of a *hartal* on firm exports. We do this by using the following approach. Suppose there is a *hartal* on day t. From our estimates in Table 3, we know that this *hartal* will have an effect on exports on day t. We also know that this *hartal* will affect a firm's shipments on day $t-1$ as well as on day $t+1$. Thus, the sum of these three effects represents the cumulative effect of a *hartal* over a three-day period that includes the day of the *hartal* as the midpoint. The impact of a *hartal* on day $t+1$ on firm exports on day t is given by the coefficient for H_{t+1}.[10] Similarly, the impact of a *hartal* on day $t-1$ on firm exports on day t is given by the coefficient for H_{t-1}. Thus, the cumulative effect of a *hartal* over a three-day period that includes the *hartal* day as the midpoint is $\sum_{s=-1}^{5}\beta_{t-s}$. This cumulative effect is reported at the bottom of column (2). It suggests that a *hartal* lowers firm exports by 7.2% over this three-day period.

In column (3) of Table 3 we estimate the complete version of equation (2) by including the full set of *hartal* indicators, $\sum_{s=-1}^{5} H_{t-s}$. The coefficients for H_t, H_{t+1}, and H_{t-1} are similar to column (2). However, the coefficients for the longer-lagged *hartal* indicators suggest that firms increase their export shipments a few days after the *hartal* itself. For instance, the coefficient for H_{t-2} suggests that firm exports on day t increase by 1.6% if there was a *hartal* two days ago.

[10] Recall that the coefficient for H_{t+1} captures how firms adjust their export shipments if there is a *hartal* tomorrow.

Similarly, firm exports on day t increase by 0.8% and 1.5% if there was a *hartal* three and five days ago respectively.

The results above suggest that a *hartal* reduces exports on the day of the *hartal* itself as well as the day after. However, firms adjust by increasing their exports starting at two days after the *hartal*. Thus, it is clear that this adjustment attenuates the immediate negative effect of the *hartal* on exports. To gauge whether this adjustment allows firms to completely overcome the initial export loss due to a *hartal*, we report the cumulative effect at the bottom of column (3). The cumulative effect of a *hartal* over this seven-day period $[H_{t+1}, H_t, \dots, H_{t-5}]$ is a reduction in firm exports of 4.5%. Notice that this cumulative effect is lower than the effect reported at the bottom of column (2), which was calculated over a three-year period. This adjustment behavior is illustrated in Figure 4. It suggests that the cumulative effect reaches its trough the day after a *hartal* and moves towards zero during the subsequent days.

Next, we examine whether the adjustment behavior of firms depends on the amount of notice that they receive regarding a *hartal*. From Table 1 we know that the typical *hartal* is announced 5.5 days before the *hartal* itself. Naturally, a *hartal* that has six days' notice will allow firms to adjust their behavior better than a hartal that is announced with two days' notice. To examine whether this is the case, we categorize all *hartals* into two categories. We define a "*hartal* with limited notice" as one where the gap between the *hartal* date and the announcement date is three days or less. All other *hartals* are categorized as "*hartals* with notice".

In column (4) of Table 3, we use *hartal* indicators that are one for only *hartals* with limited notice. For instance, in column (4), H_t is an indicator variable that is one if there is a *hartal* today that was announced with three or fewer days notice, i.e. a *hartal* with limited notice. Importantly, this indicator variable is zero if there is a *hartal* today that was announced more than three days ago. As we found in column (3), *hartals* with limited notice have an adverse

effect on firm exports on the day of the *hartal* as well as the day after a *hartal*. However, firms increase their exports starting at two days after the *hartal*. In column (5) we use *hartal* indicators that are one for only *hartals* with notice. For instance, in column (5), H_t is an indicator variable that is one if there is a *hartal* today that was announced with more than three days notice. This indicator is zero for a *hartal* today that was announced three or fewer days ago. The estimates in column (5) also support the adjustment behavior found in the earlier columns.

In Table 4 we examine whether the impact of *hartals* on firm exports depends on certain exporter characteristics. In columns (1) and (2) we restrict the samples to small and large exporters respectively. Small exporters are ones with average exports over the entire sample period that is below the sample median. In column (1) we restrict the sample to these firms. The results suggest that the adjustment behavior highlighted before do not apply to small exporters. For these exporters, the cumulative effect on the day of the *hartal* (a reduction of firm exports by 5.8%) is similar to the cumulative effect over the seven day period (a reduction of firm exports by 6.1%).

In column (2) of Table 4 we restrict the sample to large firms. These are firms with average exports over the sample period that is at or above the sample median. The results suggest that large exporters attenuate the immediate export loss due to a *hartal* by increasing their exports starting two days after the *hartal*. For these exporters, the cumulative effect on the day of the *hartal* (a reduction of firm exports by 6.7%) is greater in magnitude than the cumulative effect over the seven day period (a reduction of firm exports by 2.8%).

In columns (3) and (4) we examine whether the price of a firm's export good has an effect on how its exports are affected by *hartals*. To the extent that lower-priced goods are generic in nature, international buyers will have a greater ability to acquire the products from another country if a Bangladeshi exporter is unable to meet a delivery deadline due to a *hartal*. On the

other hand, if higher-priced goods are more customized, then buyers may not be able to switch to another supplier if a Bangladeshi exporter is unable to meet a delivery deadline. This suggests that *hartals* will have a more adverse effect on the exports of firms that produce lower-priced, generic goods.

To examine the above hypothesis, we restrict the sample to high-priced exporters in column (3). We define high-priced exporters as those with an average price over the entire sample period that is above the sample median. The results in column (3) suggest that the cumulative effect of *hartals* for these firms is a reduction in export value of 2.8%. In column (4) we restrict the sample to low-priced exports, i.e. exporters with an average price over the entire sample period that is at or below the sample median. The results in column (4) suggest that the cumulative effect of *hartals* for these firms is a reduction in export value of 6%. Thus, these results confirm that firms producing lower priced, generic products are more adversely affected by *hartals*.

4.2 *Hartals* and the Mode of Transportation

One of the ways in which the exporters in our sample may cope with the delays and disruptions caused by *hartals* is to export their goods through air rather than through the sea. The use of air shipments allows these exporters to potentially overcome the delays caused by *hartals*. To examine whether firms actually use this strategy, we estimate a version of equations (1) and (2) with a dependent variable that is one for air shipments and zero otherwise. The results are reported in Table 5. In column (1) we estimate the contemporaneous effect of *hartals* on the probability of air shipment. The results suggest that a *hartal* increases the probability of air shipment on the day of the *hartal* by 3 percentage points. In our data, 19.8% of shipments are

made by air. Thus, the impact estimated in column (1) represents a significant increase in the likelihood of air shipment.

In column (2) we examine the cumulative effect of *hartals* on air shipment over a three-day period with the *hartal* as the midpoint. The results suggest that firms decrease their use of air shipment the day before a *hartal* and increase their use of air shipment on the day of a hartal as well as on the day after. The cumulative effect over this three-day period, as reported at the bottom of column (2), is a 3.2 percentage point increase in the probability of air shipment due to a *hartal*. In column (3) we estimate a version of equation (2) with an indicator for air shipment as the dependent variable. Once again we observe firms altering their shipment mode to attenuate the adverse effect of *hartals*. For instance, the results suggest that firms decrease air shipments the day before the *hartal*, increase air shipments on the day of the *hartal* as well as the day after, and then reduce air shipments a few days after the *hartal*. This is illustrated in Figure 5. The cumulative effect over a seven-day period is a 2.1 percentage point increase in the probability of air shipment due to a *hartal*. This is considerably lower than the contemporaneous effect of 3 percentage points.

In columns (4) and (5) of Table 5 we examine whether the impact of *hartals* on air shipment depends on the notice that firms receive regarding the *hartal* date. In column (4) we define our *hartal* indicators as one if there is a *hartal* on that day that was announced three or fewer days ago (i.e. "*hartals* with limited notice"). In column (5) we define our *hartal* indicators as one if there is a *hartal* on that day that was announced more than three days ago (i.e. "*hartals* with notice"). In both cases, the cumulative effect over a seven-day period is similar in magnitude.

4.3 *Hartal* Heterogeneity

In Table 6 we examine if our baseline results change if we focus on particular type of *hartals*. In columns (1) and (2) we focus on long vs. short *hartals*. Long *hartals* are those that are called for more than 12 hours whereas short-*hartals* are those that are called for less than 12 hours ("half-day *hartal*"). In both cases, we observe an adjustment pattern that is similar to our previous results. That is, *hartals* reduce exports on the day of the *hartal* as well as the day after the *hartal* is called. However, firms increase their exports starting at several days after the *hartal* itself. In the case of longer *hartals*, the cumulative effect of a *hartal* over a seven-day period is a reduction in export value of 8.5%. On the other hand, for short *hartals*, the cumulative effect of a *hartal* over a seven-day period is a reduction in export value of 3.8%.

In columns (5) and (6) we distinguish between the two types of *hartals* in our data: (a) strike and (b) blockade. The former involves a countrywide shutdown of major roads and highways while the latter is a blockade of all roads into and out of major cities (typically the capital, Dhaka). Our baseline measure of *hartal* does not distinguish between these two. We examine whether they have different effects on firm exports in columns (5) and (6) of Table 6. In column (5) our *hartal* indicator as one if there was a strike on a given day and zero otherwise. The cumulative effect of such *hartals* over a seven-day period is a reduction of firm exports of 3.9%. In column (6) our *hartal* indicator as one if there was a blockade on a given day and zero otherwise. In this case, the cumulative effect of such *hartals* over a seven-day period is a reduction of firm exports of 3.6%. Thus, these two types of disruptions have very similar cumulative effects on firm export values.

4.4 Ready-Made Garments

In Table 7 we restrict the sample to ready-made garments (RMG) firms. These firms represent over 75 percent of the observations in our sample and are the primary export earners for Bangladesh. This is also an industry where "lean retailing" is prevalent (Evans and Harrigan, 2005). This is a scenario in which firms need to respond rapidly to changes in buyer demand without holding large stocks of inventory. Such a practice raises the demand for timeliness and, in theory, should make delays due to political violence more costly. In other words, relative to the overall sample, we should find that the effect of *hartals* is stronger for RMG firms. In column (1) we estimate the contemporaneous effect of a hartal on the total daily exports of RMG firms (equation (1)). The coefficient of the *hartal* indicator confirms that *hartals* have a statistically significant, negative effect on firm exports. It suggests that a *hartal* lowers the total daily exports of the average RMG firm in the sample by 7.3% on that day. This effect is higher than the 6.6% reduction in total daily exports we estimated for the overall sample.

As was the case in the overall sample, we also observe that RMG firms compensate for the delays caused by a *hartal* by adjusting their exporting behavior on the days before and after the *hartal* itself. For instance, the results in columns (2) and (3) of Table 7 suggest that RMG firms increase their export the day before a *hartal* and as well as starting at two days after the *hartal*. Thus, it is clear that this adjustment attenuates the immediate negative effect of the *hartal* on exports. To gauge whether this adjustment allows firms to completely overcome the initial export loss due to a *hartal*, we report the cumulative effect at the bottom of column (3). The cumulative effect of a *hartal* over this seven-day period $[H_{t+1}, H_t, \dots, H_{t-5}]$ is a reduction in firm exports of 2.3%. Notice that this cumulative effect is lower than the effect reported at the bottom of column (2), which was calculated over a three-year period.

In columns (4)-(6) of Table 7 we examine whether RMG firms are more likely to use air shipment when faced with delays caused by *hartals*. In column (4) we estimate the contemporaneous effect of *hartals* on the probability of air shipment for RMG firms. The results suggest that a *hartal* increases the probability of air shipment on the day of the *hartal* by 3.6 percentage points. This is higher than the 3 percentage point effect we estimated for the overall sample. In columns (2) and (3) we examine the cumulative effect of *hartals* on air shipment over a three-day and seven-day period respectively. The results suggest that firms decrease their use of air shipment the day before a *hartal*, increase their use of air shipment on the day of a *hartal* as well as on the day after and then reduce air shipments a few days after the *hartal*. The cumulative effect over a seven-day period is a 2.2 percentage point increase in the probability of air shipment due to a *hartal*. This is considerably lower than the contemporaneous effect of 3.6 percentage points. Thus, these results suggest that RMG firms are relatively worse affected on the day of the *hartal* itself. However, our results suggest that their adjustment behavior is more effective in the sense that the reduction in total export value over a seven-day period is considerably smaller than the remaining sample.

5. Conclusion

To the best of our knowledge, this is the first systematic attempt to study the short-run impact of political strikes (or *hartals*) on export and the strategies that firms use to cope with this shock. The results indicate that on the day of the *hartal* itself, the average firm's export value declines by 6.6%. However, through a reallocation of shipments to other dates, firms are able to attenuate this immediate effect. In particular, over a seven-day period around a *hartal*, the cumulative effect is a reduction in firm export value of 4.5%. In other words, this is the reduction in export value that an average firm incurred even after delaying the shipment dates and using

costlier air shipments. In absolute terms, the value of cumulative exports lost to the average firm over a seven-day period is Tk. 1,814,400.[11]

The discourse on the impact of *hartals* on the Bangladeshi economy is fraught with imprecise estimates based on rudimentary data. While these estimates are useful in highlighting the negative impacts of such political strikes, crafting policy based on these estimates could be counter-productive. Our study, on the other hand, provides a robust estimate of the impact of *hartals* on firm exports using the universe of export transactions for Bangladesh. It informs us about what the maximum size of a bail-out package could be if the government were to compensate firms for the loss of exports due to a *hartal*.

Our study also highlights the heterogeneous impact of *hartals* on exports. We find that smaller exporters producing lower-priced products are disproportionately affected. This result indicates that if the government were to offer compensation packages to affected firms it should prioritize smaller firms producing lower-priced products. We also perform a separate analysis for RMG firms and the results indicate that firms in this sector are better able to make up the loss of exports due to a *hartal* by delaying shipments or using air-cargo.

[11] The average firm in the sample exports goods worth Tk. 40.32 million over a seven-day period. Therefore, a cumulative loss of 4.5% translates to a monetary loss of approximately Tk. 1.81 million.

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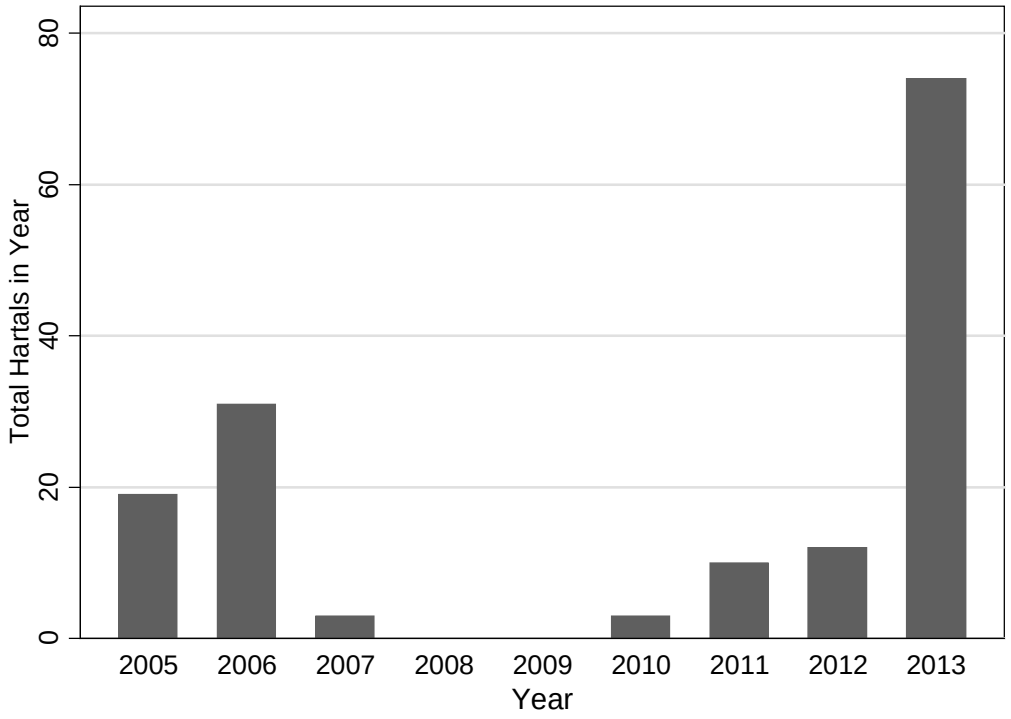

Figure 1: Annual Trend in *Hartals*

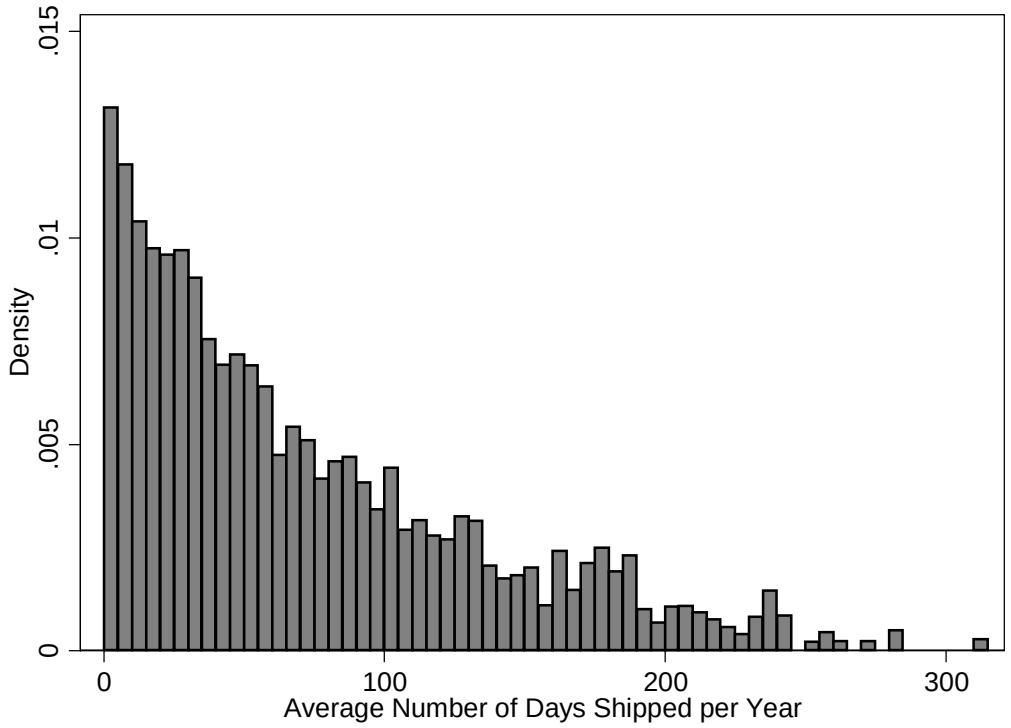

Figure 2: Frequency of Shipments

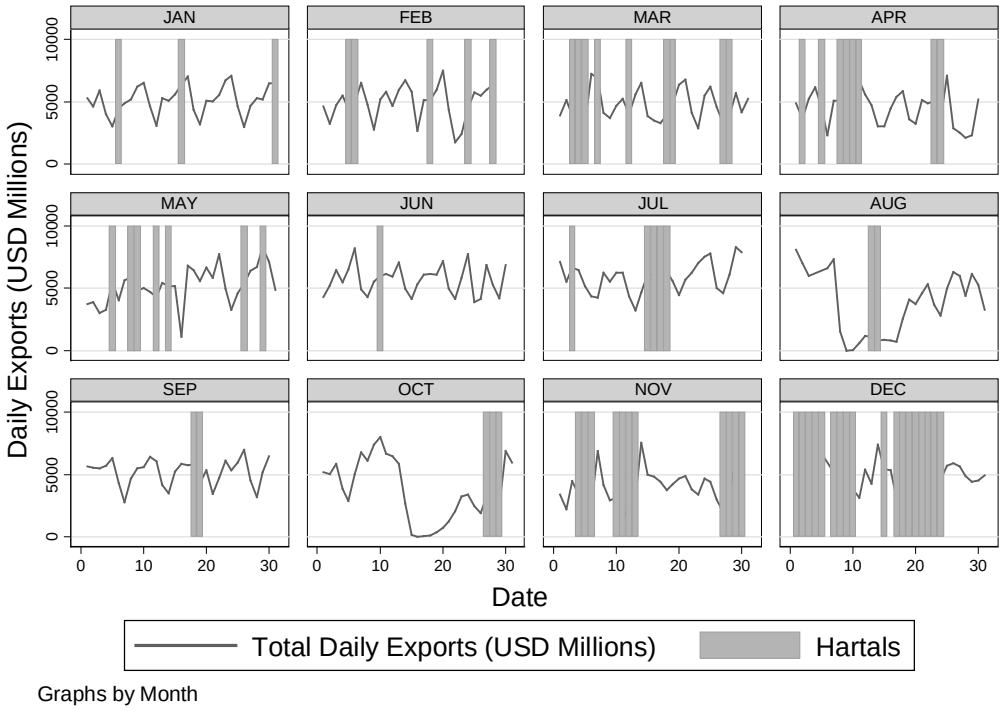

Figure 3: *Hartals* and Daily Exports in 2013

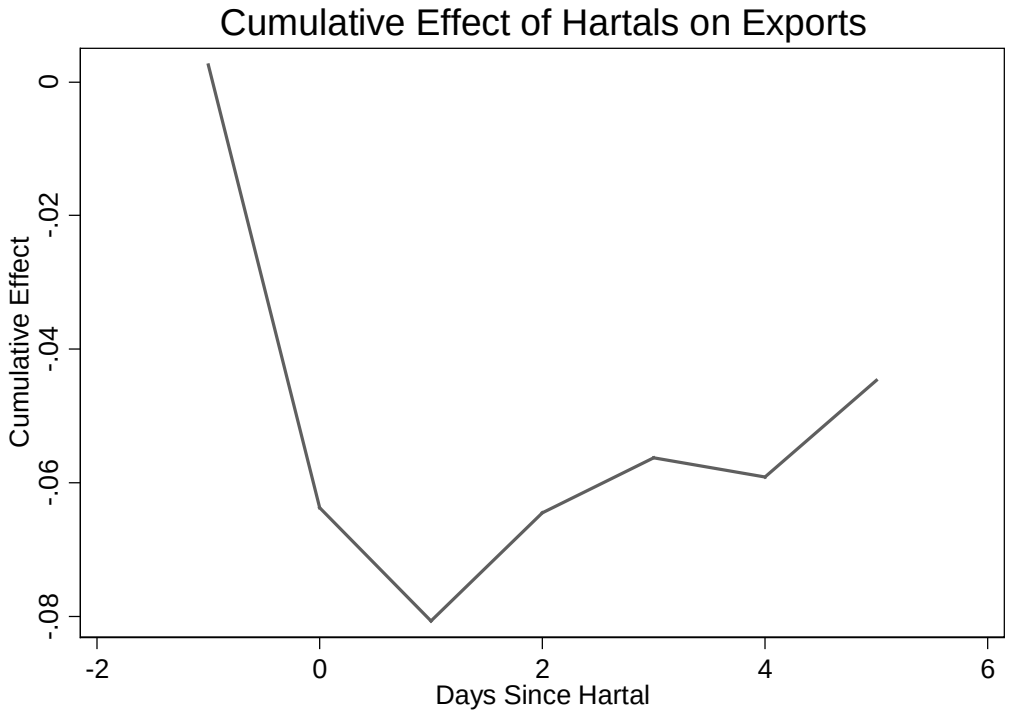

Figure 4: Cumulative effect of a Hartal on exports. A value of zero on the horizontal axis signifies the day of the hartal.

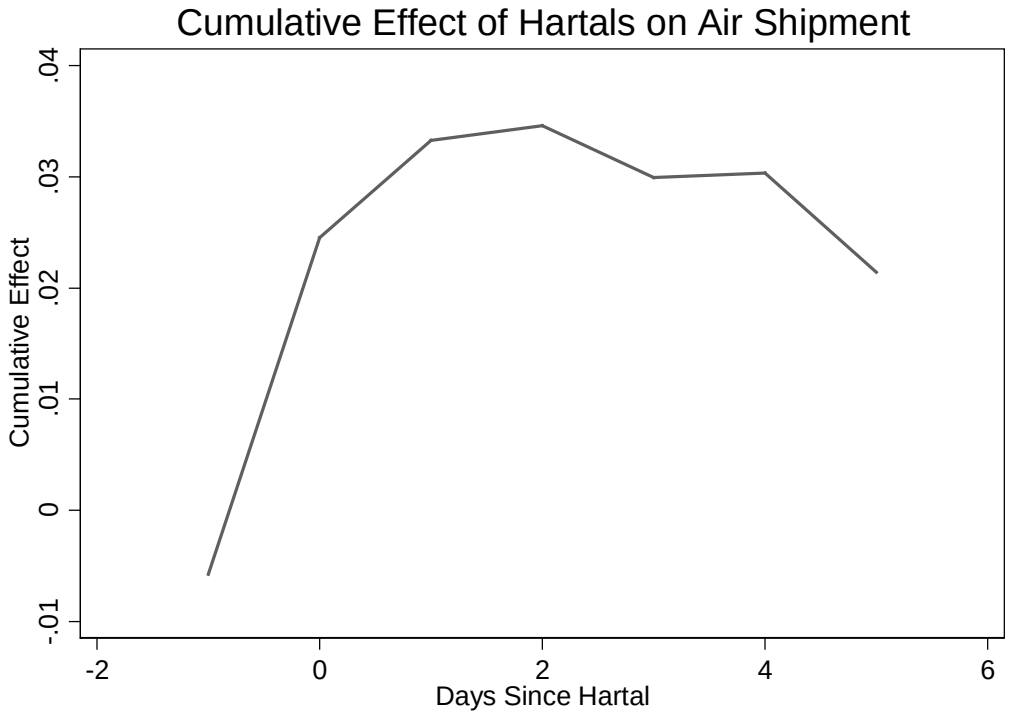

Figure 5: Cumulative effect of a Hartal on the probability of air shipment. A value of zero on the horizontal axis signifies the day of the hartal.

Table 1: *Hartals* in Bangladesh

	(1)	(2)	(3)
Years Included	2005-2013	2005-2009	2010-2013
Total *Hartals*	152	53	99
Fraction of *Hartals* that were:			
Strikes	0.74	0.66	0.78
Blockades	0.26	0.34	0.22
Spanned multiple days	0.49	0.51	0.48
Average Notice Provided (in days)	5.55	7.28	4.62
Average Number of Deaths	1.49	0.52	2.01
Average Number of Injuries	112.68	132.92	101.84

Table 2: Descriptive Statistics of Trade Data

	(1)	(2)
	Obs.	
Ln(Total Daily Exports)	2,043,514	0.876
		[1.473]
Ln(Price of Exported Goods)	1,746,663	6.496
		[1.079]
Indicator for Air Shipment	2,043,514	0.204
		[0.387]

Notes: Column (2) reports the mean and standard deviation (in brackets). The export values are in millions of constant 2010 Bangladesh Taka. The price values are in constant 2010 Bangladesh Taka.

Table 3: The Impact of *Hartals* on Daily Exports

	(1)	(2)	(3)	(4)	(5)
Dependent Variable		Ln(Total Daily Exports)			
Type of *Hartal*		All		Limited Notice	With Notice
H_t	-0.066***	-0.064***	-0.066***	-0.051***	-0.034***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.007)
H_{t+1}		0.004	0.003	0.018***	-0.074***
		(0.005)	(0.005)	(0.006)	(0.008)
H_{t-1}		-0.011**	-0.017***	-0.011*	-0.021***
		(0.005)	(0.005)	(0.006)	(0.007)
H_{t-2}			0.016***	0.010	0.010
			(0.005)	(0.006)	(0.007)
H_{t-3}			0.008*	0.016***	-0.002
			(0.005)	(0.006)	(0.007)
H_{t-4}			-0.003	-0.005	0.006
			(0.005)	(0.006)	(0.007)
H_{t-5}			0.015***	-0.007	0.038***
			(0.005)	(0.006)	(0.007)
Constant	0.653***	0.652***	0.652***	0.650***	0.652***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
R-squared	0.008	0.008	0.008	0.008	0.008
Cumulative effect ($\sum H_{t+s}$)	-	-0.072	-0.045	-0.031	-0.077
P-value (H_0: $\sum H_{t+s} = 0$)	-	[0.00]	[0.00]	[0.01]	[0.00]

Notes: N = 2,041,427. *Hartals* with limited notice are defined as *hartals* that were announced less than four days before the *hartal* itself. *Hartals* with notice are defined as ones where the *hartal* was announced more than three days before the *hartal* itself. All regressions include exporter, month, year, and day of week fixed effects along with a day-of-year trend. Robust standard errors in parentheses are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 4: The Role of Exporter Characteristics

	(1)	(2)	(3)	(4)
Dependent Variable	Ln(Total Daily Exports)			
Exporter Characteristic	Small	Large	High-Price	Low-Price
H_t	0.001	0.006	0.011	-0.005
	(0.006)	(0.007)	(0.007)	(0.006)
H_{t+1}	-0.059***	-0.073***	-0.087***	-0.045***
	(0.006)	(0.008)	(0.008)	(0.006)
H_{t-1}	-0.005	-0.029***	-0.020***	-0.014**
	(0.006)	(0.007)	(0.007)	(0.006)
H_{t-2}	0.000	0.031***	0.020***	0.012*
	(0.006)	(0.007)	(0.007)	(0.007)
H_{t-3}	-0.001	0.018**	0.024***	-0.008
	(0.006)	(0.007)	(0.007)	(0.006)
H_{t-4}	-0.008	0.002	0.001	-0.007
	(0.006)	(0.007)	(0.007)	(0.006)
H_{t-5}	0.011*	0.018**	0.021***	0.007
	(0.006)	(0.007)	(0.007)	(0.006)
Constant	0.161***	1.148***	0.746***	0.556***
	(0.013)	(0.020)	(0.019)	(0.015)
R-squared	0.010	0.008	0.009	0.008
Cumulative effect ($\sum H_{t+s}$)	-0.061	-0.028	-0.028	-0.060
P-value (H_0: $\sum H_{t+s} = 0$)	[0.00]	[0.06]	[0.05]	[0.00]

Notes: N = 1,021,628. Small exporters are ones with average exports over the entire sample period that is below the sample median. The remaining firms are classified as large exporters. High-price exporters are ones with average price over the entire sample period that is above the sample median. The remaining firms are classified as low-price exporters. All regressions include exporter, month, year, and day of week fixed effects along with a day-of-year trend. Robust standard errors in parentheses are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 5: The Impact of *Hartals* on Air Shipment

	(1)	(2)	(3)	(4)	(5)
Dependent Variable		Indicator for Air Shipment			
Type of *Hartal*		All		Limited Notice	With Notice
H_t	0.030***	0.030***	0.030***	0.024***	0.034***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
H_{t+1}		-0.006***	-0.006***	-0.007***	0.002
		(0.001)	(0.001)	(0.001)	(0.002)
H_{t-1}		0.008***	0.009***	0.013***	0.002
		(0.001)	(0.001)	(0.002)	(0.002)
H_{t-2}			0.001	0.006***	-0.000
			(0.001)	(0.001)	(0.002)
H_{t-3}			-0.005***	-0.007***	-0.000
			(0.001)	(0.001)	(0.002)
H_{t-4}			0.000	-0.003*	0.002
			(0.001)	(0.001)	(0.002)
H_{t-5}			-0.009***	-0.001	-0.017***
			(0.001)	(0.001)	(0.002)
Constant	0.226***	0.226***	0.227***	0.228***	0.227***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
R-squared	0.019	0.019	0.019	0.019	0.019
Cumulative effect ($\sum H_{t+s}$)	-	0.032	0.021	0.025	0.023
P-value (H_0: $\sum H_{t+s} = 0$)	-	[0.00]	[0.00]	[0.00]	[0.00]

Notes: N = 2,041,427. *Hartals* with limited notice are defined as *hartals* that were announced less than four days before the hartal itself. *Hartals* with notice are defined as ones where the *hartal* was announced more than three days before the *hartal* itself. All regressions include exporter, month, year, and day of week fixed effects along with a day-of-year trend. Robust standard errors in parentheses are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 6: The Impact of *Hartals* on Exports by Other *Hartal* Characteristics

	(1)	(2)	(3)	(4)
Dependent Variable	Ln(Total Daily Exports)			
Type of *Hartal*	Long	Short	Strike	Blockade
H_t	-0.102***	-0.039***	-0.056***	-0.102***
	(0.010)	(0.005)	(0.005)	(0.013)
H_{t+1}	0.060***	-0.026***	0.001	0.035***
	(0.008)	(0.005)	(0.005)	(0.012)
H_{t-1}	-0.150***	0.023***	-0.008	-0.044***
	(0.011)	(0.005)	(0.005)	(0.014)
H_{t-2}	0.071***	-0.000	0.019***	0.000
	(0.009)	(0.005)	(0.005)	(0.014)
H_{t-3}	0.013	-0.009*	0.009*	0.004
	(0.008)	(0.005)	(0.005)	(0.013)
H_{t-4}	0.005	-0.004	-0.006	0.010
	(0.009)	(0.005)	(0.005)	(0.013)
H_{t-5}	0.018**	0.017***	0.002	0.061***
	(0.008)	(0.005)	(0.005)	(0.011)
Constant	0.649***	0.651***	0.652***	0.649***
	(0.012)	(0.012)	(0.012)	(0.012)
R-squared	0.008	0.008	0.008	0.008
Cumulative effect ($\sum H_{t+s}$)	-0.085	-0.038	-0.039	-0.036
P-value (H_0: $\sum H_{t+s} = 0$)	[0.00]	[0.00]	[0.00]	[0.04]

Notes: N = 2,041,427. Long *Hartals* are those that last more than 12 hours. All remaining *Hartals* are classified as short. All regressions include month, year, and day of week fixed effects along with a day-of-year trend. Robust standard errors in parentheses are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Table 7: The Impact of *Hartals* on Daily Exports and Air Shipment – RMG Only

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Ln(Total Daily Exports)			Indicator for Air Shipment		
H_t	-0.073***	-0.074***	-0.077***	0.036***	0.036***	0.036***
	(0.006)	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)
H_{t+1}		0.017***	0.015***		-0.009***	-0.008***
		(0.005)	(0.005)		(0.001)	(0.001)
H_{t-1}		-0.013**	-0.022***		0.010***	0.012***
		(0.006)	(0.006)		(0.001)	(0.001)
H_{t-2}			0.021***			-0.000
			(0.005)			(0.001)
H_{t-3}			0.013**			-0.006***
			(0.005)			(0.001)
H_{t-4}			0.000			-0.000
			(0.005)			(0.001)
H_{t-5}			0.026***			-0.011***
			(0.005)			(0.001)
Constant	0.767***	0.766***	0.764***	0.210***	0.211***	0.211***
	(0.014)	(0.014)	(0.014)	(0.004)	(0.004)	(0.004)
R-squared	0.009	0.009	0.009	0.022	0.022	0.023
Cumulative effect ($\sum H_{t+s}$)	-	-0.070	-0.023	-	0.037	0.022
P-value (H_0: $\sum H_{t+s} = 0$)	-	[0.00]	[0.04]	-	[0.00]	[0.00]

Notes: N = 1,539,776. These regressions use a sample of firms in the ready-made garments industry. All regressions include exporter, month, year, and day of week fixed effects along with a day-of-year trend. Robust standard errors in parentheses are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Appendix

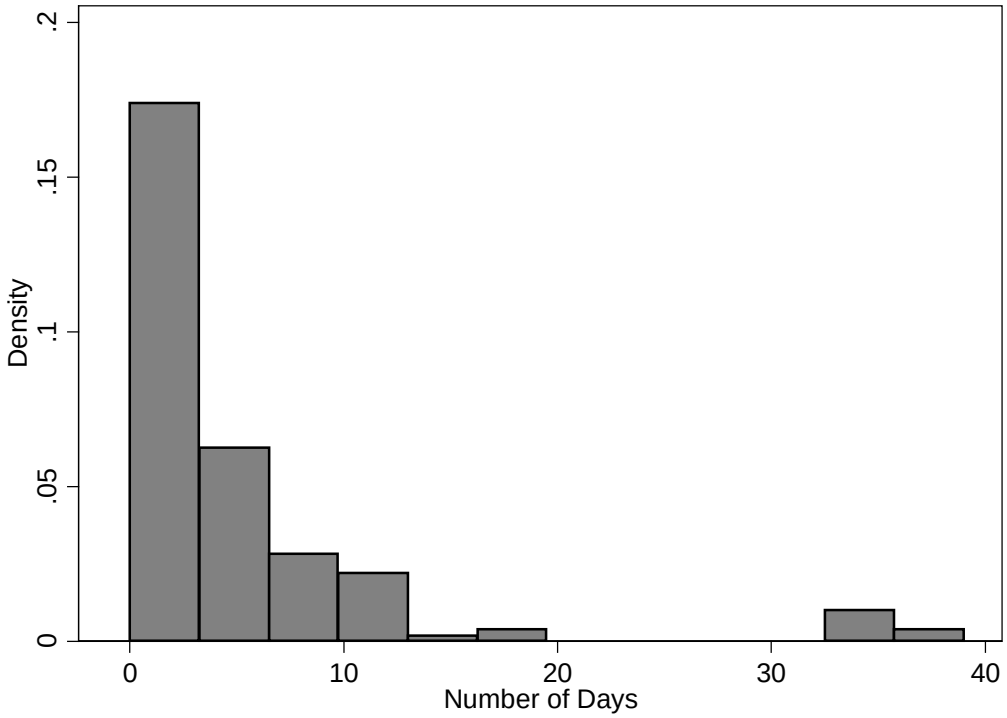

Figure A1: Distribution of the gap between a *hartal* date and the announcement date.

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